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Software Engineering Institute
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Method Engineering using OPFRO

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Chair, OPF Repository Organization
http://www.opfro.org

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Report Documentation Page

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Topics

- **Basic Concepts and Terminology**
- State of the Practice
- Current Challenges
- Description of the OPFRO
- Method Engineering using OPFRO
- Current Limitations
- Future Directions
- Conclusion

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Basic Concepts & Terminology

Method & Method Component

Process & Process Improvement

Process Metamodel

Method Component Repository

OPEN, OPF, and OPFRO

Method Tailoring & Method Engineering

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Basic Concepts & Terminology 2

Method (a.k.a., methodology)

- A standardized way of describing a process consisting of a cohesive and consistent collection of integrated method components
- A model of a set of similar processes

Method Component (a.k.a., method element or fragment)

- A cohesive part of a method

Method should contain *all* types of method components:

- *Work products* to be produced or modified
- *Work units* to be performed on work products
- *Producers* who perform work units on work products
- *Stages* during which work units are performed
- *Endeavors* staffed by producers and organized by stages

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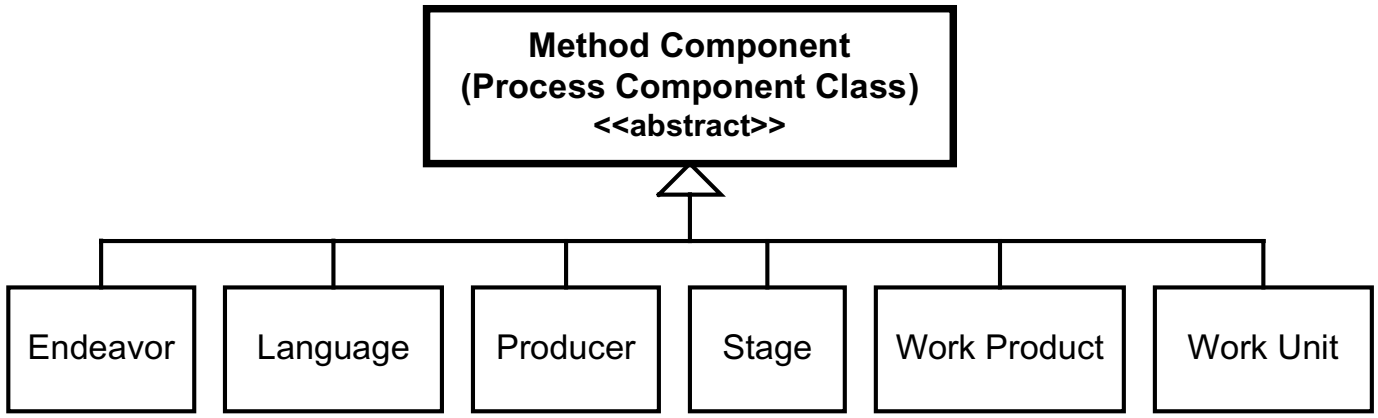
Types of OPF Method Components



Note that method components (process component classes) actually need to be clabjects having both class and object characteristics. Clabjects are used to implement the Powertype pattern and are needed to ensure that core framework “classes” are properly connected through concrete method components to process instances.

Most developers should probably just consider method components to be classes of process components related by inheritance (generalization). Clabjects and Powertype pattern are formalisms of primary interest to professional methodologists and process tool vendors.

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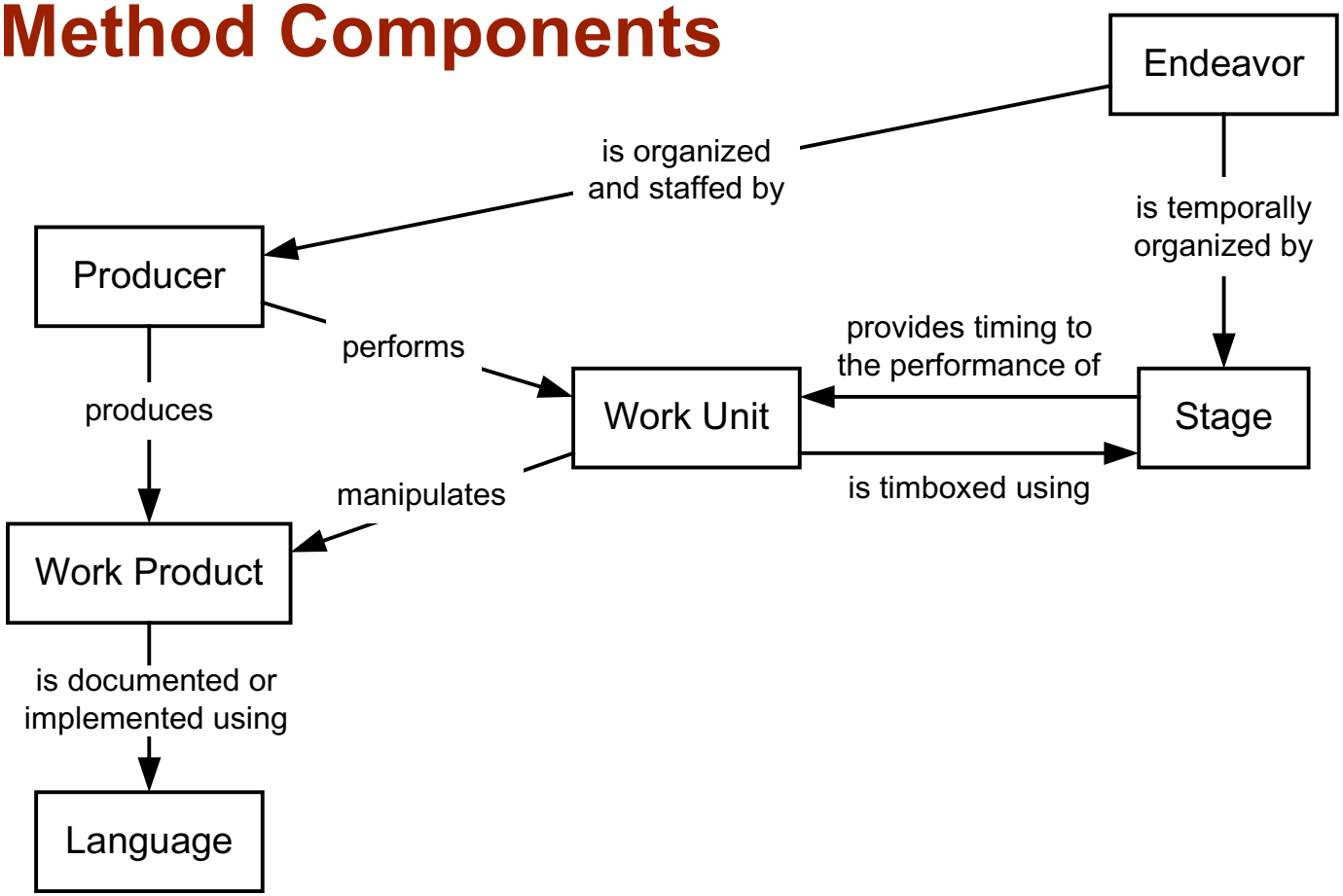
Relationships between Core OPF Method Components



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Basic Concepts & Terminology 3

Process

- How real people and tools actually perform real work to produce or update real work products during the stages of real endeavors
  For example, Mary Brown's use of I-Logix's Rhapsody to create her UML design for the Fire Detection subsystem of her company's Home Control system.
- The enactment ("instance") of a method

Process Improvement

- Work performed to improve the processes actually used on endeavors, typically by improving the associated method and its usage

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Basic Concepts & Terminology 4

Process Metamodel

- A metamodel for modeling processes
- A model for modeling methods (defines modeling language)

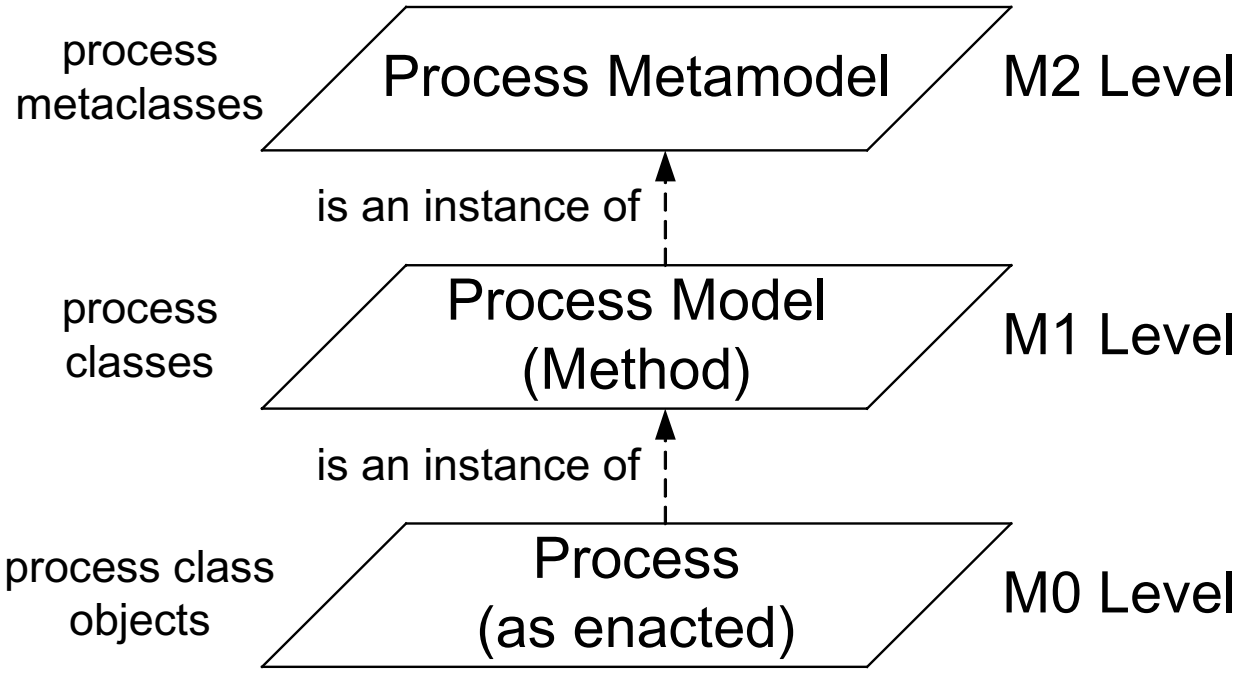
Examples include:

- OPF Metamodel (OPEN Consortium)
- AS4651-2004 (Australia)
- ISO 24744 (draft)
- SPEM (OMG)

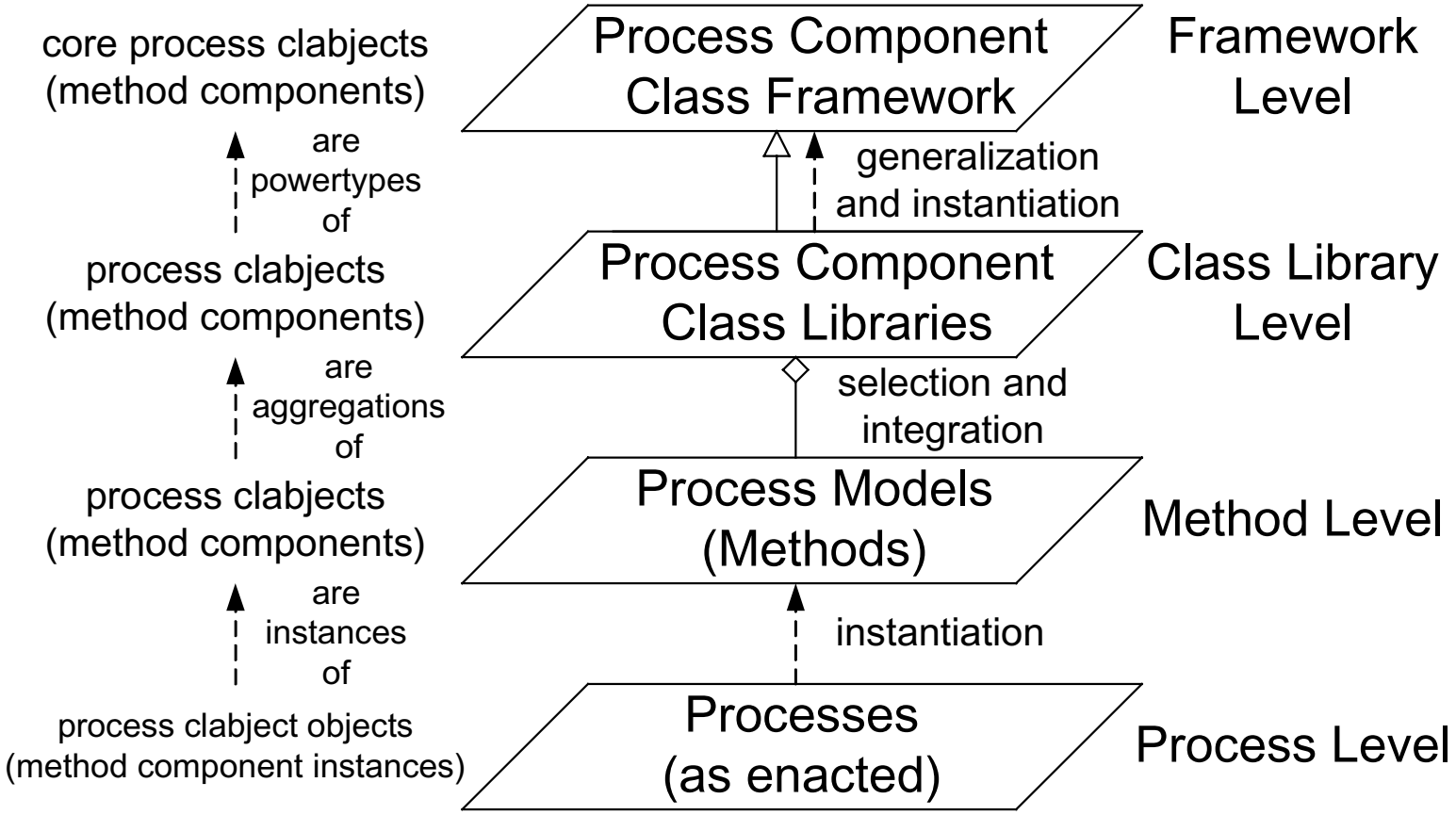
Method Repository

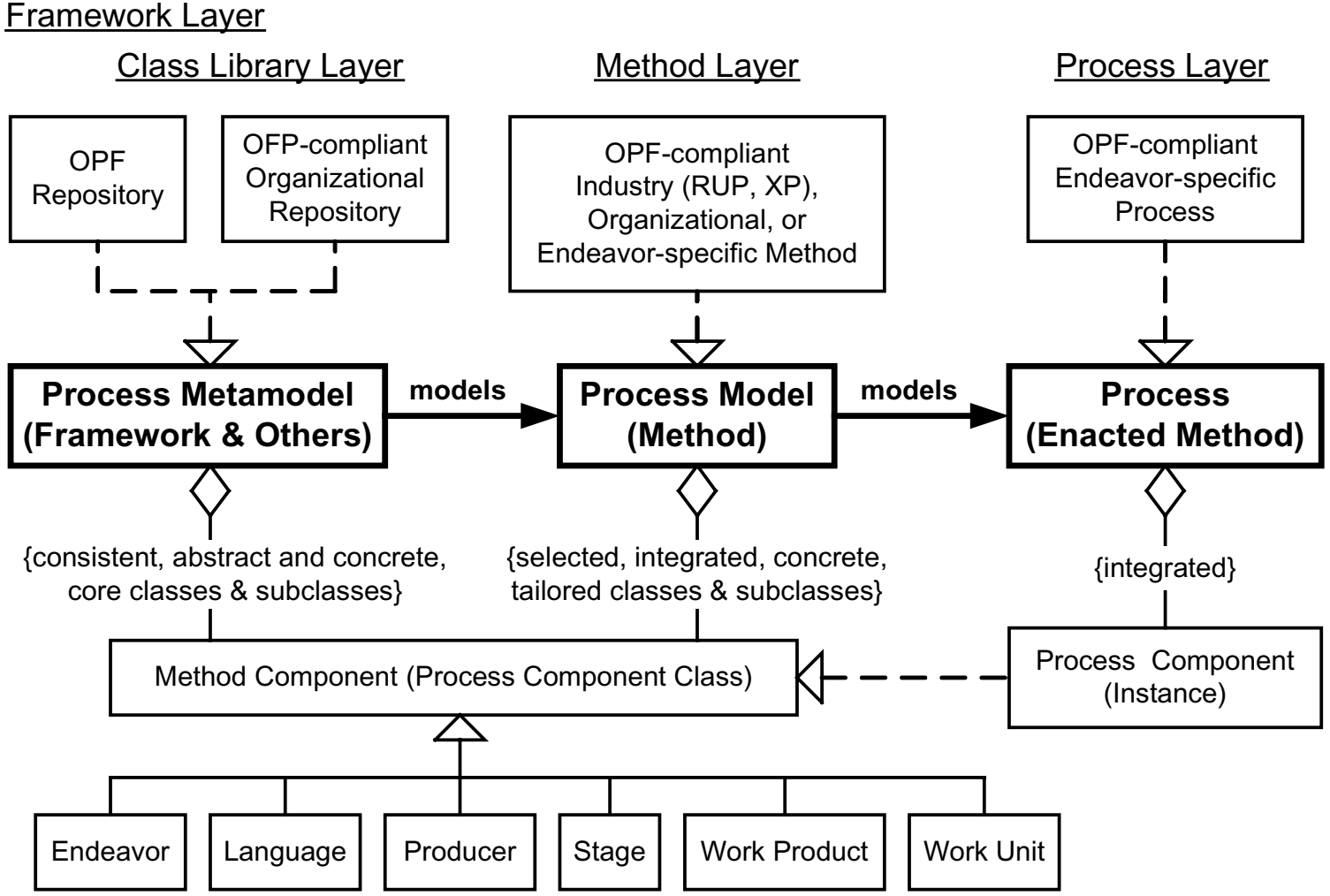
- A repository for storing reusable:
  - Method components
  - Methods

Traditional OMG Process Metamodel

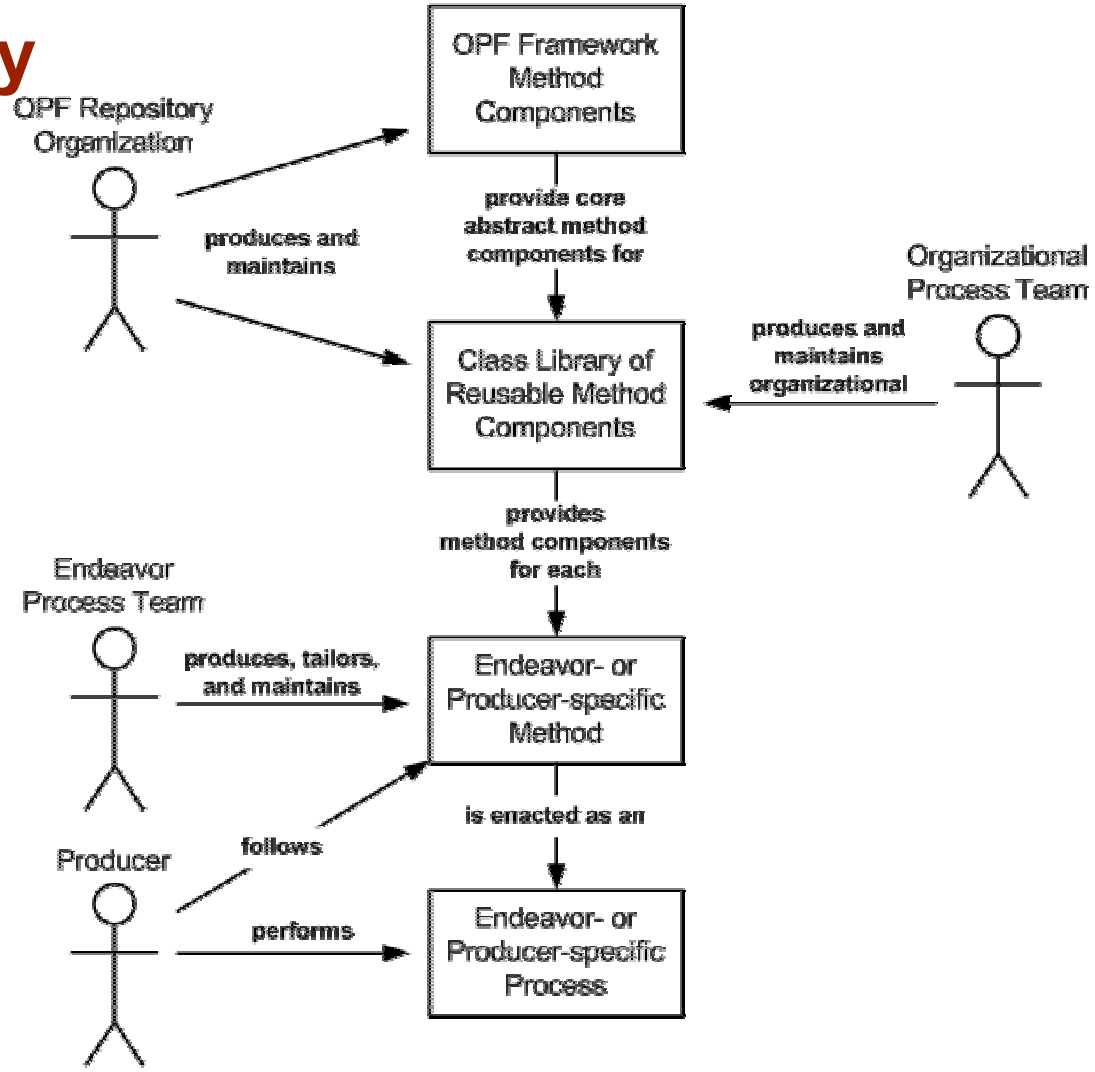


OPF Process Metamodel





Repository Users



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Basic Concepts & Terminology 5

Open Process, Environments, and Notation (OPEN) Consortium

- A consortium of methodologists, process consultants, academic researchers, process engineers, and tool vendors http://www.open.org.au

OPEN Process Framework (OPF)

- The process framework developed and maintained by the OPEN Consortium

OPFRO

- The organization that develops and maintains the OPF repository http://www.opfro.org

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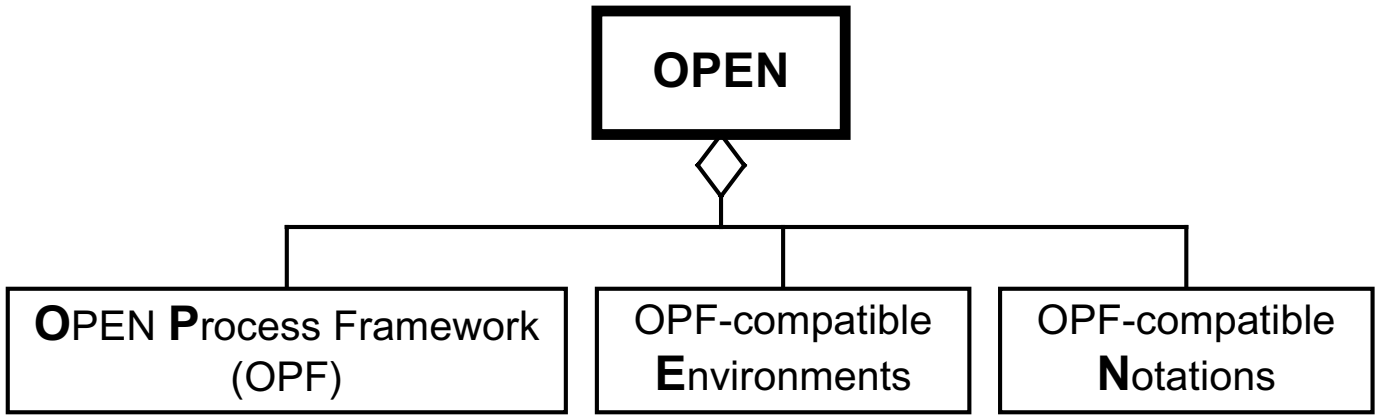
OPEN



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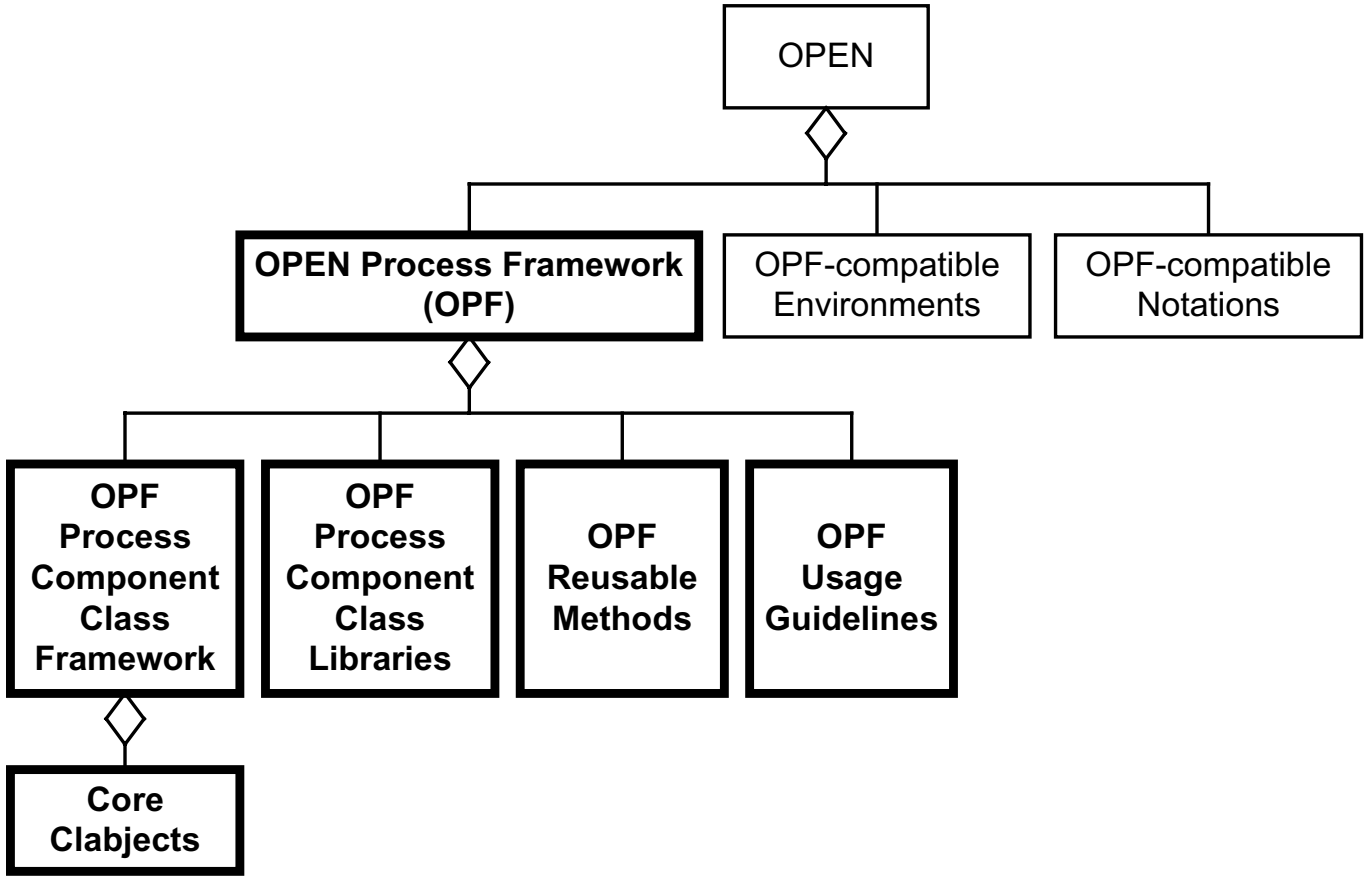
OPF Process Framework (OPF)



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Basic Concepts & Terminology 6

Method Tailoring

- Modifying an existing method to make it better fit the needs of a single endeavor

[Situational] Method Engineering

- Creating endeavor-specific methods by reusing (e.g., selecting, tailoring, and integrating) reusable method components

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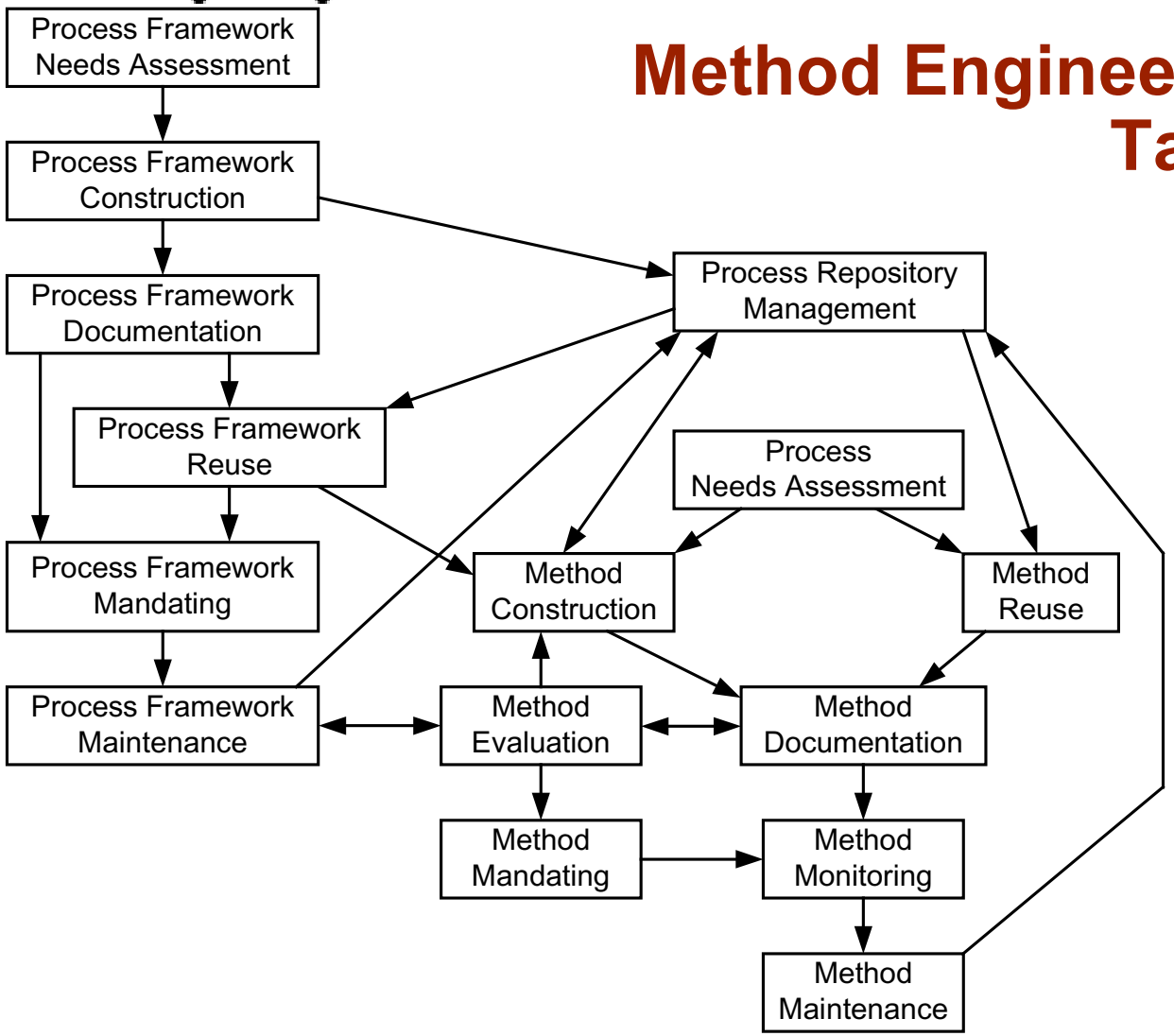
Method Engineering Tasks



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- Current Challenges
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State of the Practice

Method Source and Documentation:

- Ad hoc
- Popular book
- Organizational standards and procedures
- Consultant training materials
- Internet articles
- Process Tool (e.g., RUP)

Support Availability:

- Lack of local trained method/ process engineer
- Short term consultant
- Web websites and articles

Method tailoring and engineering:

- Some initial tailoring (often inadequate)
- Method engineering is rare and tools are mostly academic proof-of-concept prototypes

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State of the Practice 2

Results:

- Shelfware
- Methods that are inappropriate:
  - Incomplete
    (missing needed roles, teams, disciplines, tasks, techniques, and work products)
  - Too heavy for project
    (e.g., waterfall and excessively document driven)
  - Too light for system size, business criticality, safety, and security, etc.
    (e.g., too agile)
- Poor Quality Systems and Software Applications
- Inconsistent:
  - Usage
  - Outcomes

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Current Challenges

Every Endeavor is Unique.

Every Endeavor is Unique.

Process Engineers must contend with different:

- Product Characteristics
- Endeavor Characteristics
- Organizational Characteristics
- Method Characteristics

Methods Used do not Match Process Needs

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Product Characteristics 1

Different product characteristics include different:

- Product Type:
  - System vs. Software Application
- Product Number:
  - Single System
  - Initial Production
  - Mass Production
- Product Newness:
  - “Green Field” vs. Enhancement
- Product Variants:
  - Single Product vs. Product Line

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Product Characteristics 2

More different product characteristics include different:

- Product Size
  - Number of Requirements
  - Function Points
  - Subsystems
- Product Complexity
- Business Criticality
- Requirements Stability
- Technology Maturity
- Relevant Disciplines:
  - Such as Content Management & Digital Branding
- Quality Factor Criticality:
  - Such as Reliability, Performance, Safety, & Security

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Endeavor Characteristics 1

Different endeavor characteristics include different:

- Endeavor Type:
  - Single Project
  - Program of Projects
  - Enterprise

- Endeavor Contracting:
  - Formally Specified and Binding
  - Informal Contract
  - No Contract

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Endeavor Characteristics 2

More different endeavor characteristics include different :

- Endeavor Scope:
  - Business Reengineering Phases
  - System Development Phases
  - Operation / Usage Phases
  - Retirement Phase
- Endeavor Schedule:
  - Extremely Short to Generous (incredibly rare)
- Endeavor Funding:
  - Under Funded through Over Funded (also rare)

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Organizational Characteristics 1

Different organizational characteristics include different:

- Management Culture:
  - Innovator through Laggard
  - Risk Taker through Risk Avoider
- Developer Culture:
  - Innovator (e.g., Agile)
  - Laggard (e.g., document-driven waterfall)
  - Web UI designers vs. web technical developers
- Staff Localization:
  - Everyone Co-Located
  - Locally Distributed
  - Geographically Distributed

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Organizational Characteristics 2

More different organizational characteristics include different:

- Staff Organization:
  - Same Customer and Developer Organization
  - Separate Customer and Development Organizations
  - Separate Prime and Subcontractor
  - In-House and Outsourced
- Staff Expertise, Experience, and Skill Level:
  - High, Medium, and Low
  - Generalists vs. Specialists
  - Management vs. Technologists
- Methodological Maturity:
  - No Process
  - Shelf-ware Process
  - CMMI-Level

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Method Characteristics 1

Different Method Scopes:

- Single Person
- Team
- Discipline
- Phase
- Development Cycle

Different Life Phases:

- Business Reengineering
- Product Development
- Operation
- Retirement

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Method Characteristics 2

Different Method Sources:

- Popular Book
- Internet
- Consultant
- Organization Documentation
  (e.g., Standards and Procedures)

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Method Characteristics 3

Different Method Constraints:

- International Standards (e.g., ISO and ANSI)
- National Standards (e.g., Military)
- De facto Industry Standards (e.g., RUP)
- Assessment Methods:
  - CMMI
  - SPICE or OOSPICE
- Method Types:
  - Heavy vs. Agile
- Cycle:
  - Waterfall vs. Spiral vs. Iterative/Incremental/Parallel
- Incremental and Iterative Build Length:
  - Short (days) vs. Medium (weeks) vs. Long (months)

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Method Used vs. Process Needs

Methods used do not meet process needs:

- Low Process Maturity (e.g., CMMI)
- Method Size and Complexity
- Inappropriate Methods:
  - Engineering mismatch
  - Functional Decomposition vs. OO Decomposition
  - Waterfall vs. OO Lifecycle
  - Traditional Milestones vs. Incremental Milestones and Inch Pebbles
  - Traditional Milestones Reviews vs. Incremental Reviews
- Shelf-Ware

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Description of the OPFRO

World's largest collection of free, open source, and reusable method components

Over 1,100 method components

Currently in Website http://www.opfro.org and http://www.donald-firesmith.com (original mirror site)

Available for 5 years with over 1 million visits and roughly 20 million hits (very high Google ratings)

Written in standardized XHTML format

Moving to:

- XML
- Relational database
- Eclipse epf toolset
- Vendors

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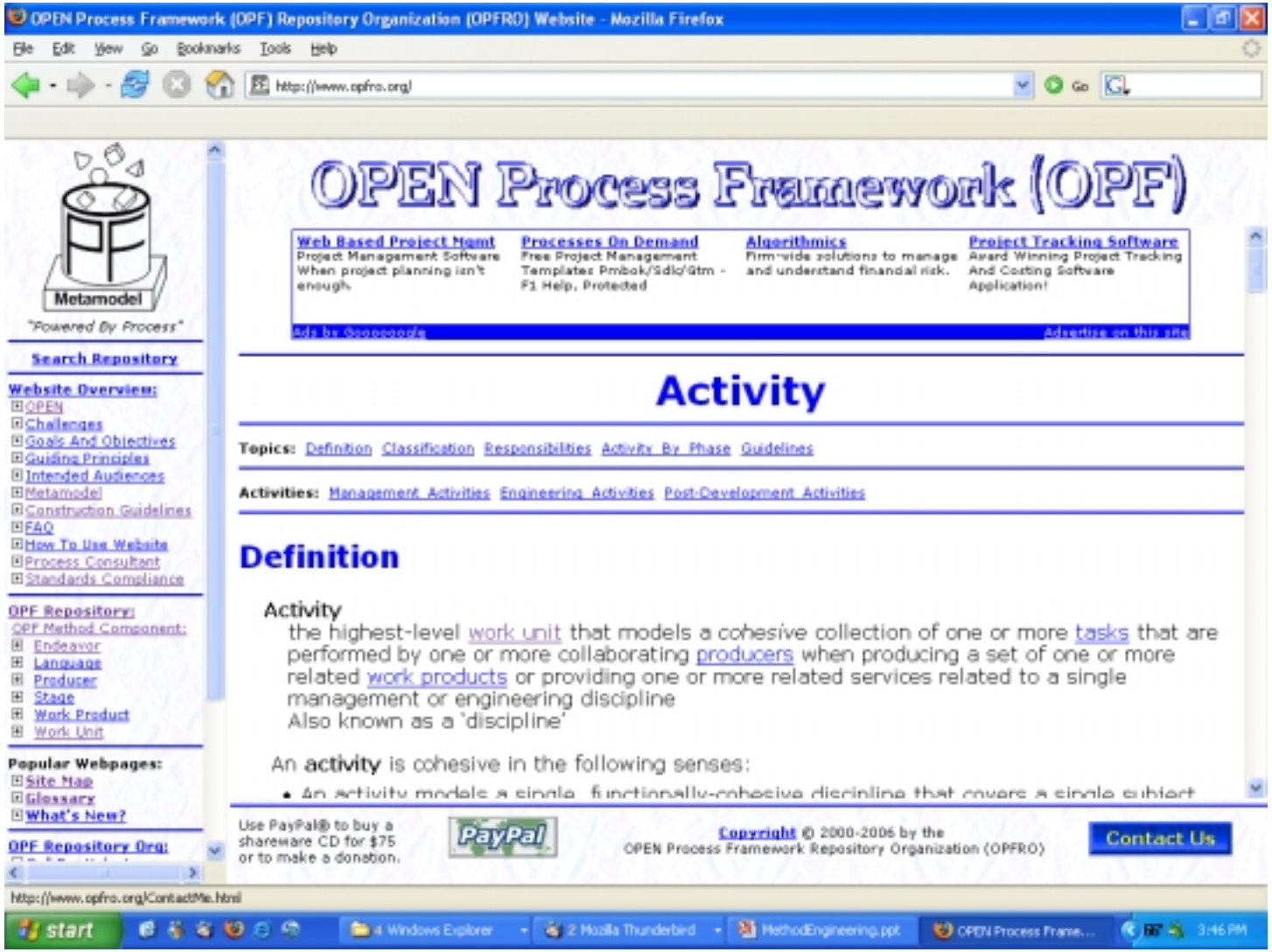
Description of the OPFRO 2

One primary webpage per method component

Organized according to OPF Metamodel

Easy, Standardized Navigation by:

- Navigation Tree Browser (left side of webpage)
- Website-Internal Search Engine
- Website-Internal Index
- Webpage Topics (top of webpage)
- Relatives (bottom of webpage)
- Internal Links (to referenced method components)


OPEN Process Framework (OPF) Repository Organization (OPFRO) Website - Mozilla Firefox
File Edit View Go Bookmarks Tools Help
http://www.opfro.org/
Metamodel
"Powered By Process"
Search Repository
Website Overview:
OPEN
Challenges
Goals And Objectives
Guiding Principles
Intended Audiences
Metamodel
Construction Guidelines
FAQ
How To Use Website
Process Consultant
Standards Compliance
OPF Repository:
OPF Method Component:
Endeavor
Language
Producer
Stage
Work Product
Work Unit
Popular Webpages:
Site Map
Glossary
What's New?
OPF Repository Org:
OPEN Process Framework (OPF)
Web Based Project Mgmt
Project Management Software When project planning isn't enough.
Processes On Demand
Free Project Management Templates Pmbok/Sdlc/Gtm - F1 Help, Protected
Algorithmics
Firm-wide solutions to manage and understand financial risk.
Project Tracking Software
Award Winning Project Tracking And Costing Software Application!
Activity
Topics: Definition Classification Responsibilities Activity By Phase Guidelines
Activities: Management Activities Engineering Activities Post-Development Activities
Definition
Activity
the highest-level work unit that models a cohesive collection of one or more tasks that are performed by one or more collaborating producers when producing a set of one or more related work products or providing one or more related services related to a single management or engineering discipline
Also known as a 'discipline'
An activity is cohesive in the following senses:
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start
4 Windows Explorer
2 Mozilla Thunderbird
MethodEngineering.ppt
OPEN Process Frame...
3:46 PM


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File Edit View Go Bookmarks Tools Help
http://www.opfro.org/
"Powered By Process"
Search Repository
Website Overview:
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Challenges
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Endeavor
Language
Producer
Stage
Work Product
Work Unit
Popular Webpages:
Site Map
Glossary
What's New?
OPF Repository Org:
Call For Volunteers
Conventions
Copyright Notice
User's Forum
Future Enhancements
Kudos
Membership
Submissions
Terms of Use
27 Apr. 2006
OPEN Process Framework (OPF)
On small, short, and simple endeavors, an activity might be composed of only a single scaled down task performed by only a single person (perhaps playing multiple roles on multiple teams).
To provide process engineers with maximum flexibility during the instantiation of the OPEN Process Framework (OPF), any activity can theoretically be composed out of any set of tasks. However, activities should be cohesive, and the relationships between activities and their component tasks are therefore typically much more constrained. For example, requirements engineering is usually composed of requirements tasks such as requirements elicitation, requirements analysis, and requirements specification.
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Last updated on 4 March 2006.
Print This Webpage
W3C XHTML 1.0
W3C CSS
Read it!
Please sign it!
Website Statistics
Visits: 1,163,688
Hits: 18,796,263
Method Components: Endeavors Languages Producers Stages Work Products Work Units
Work Units: Activities Tasks Techniques Work Flows
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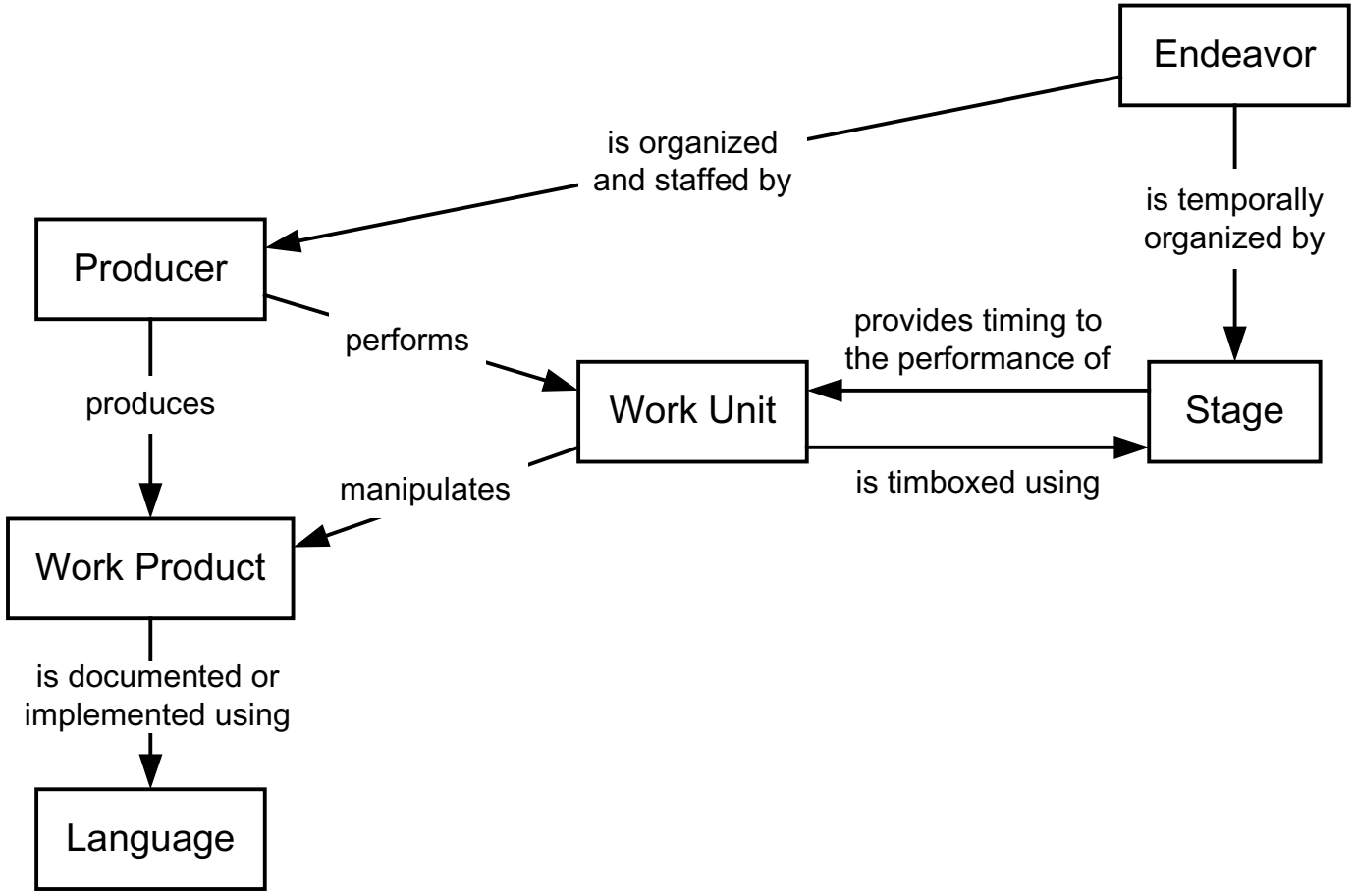
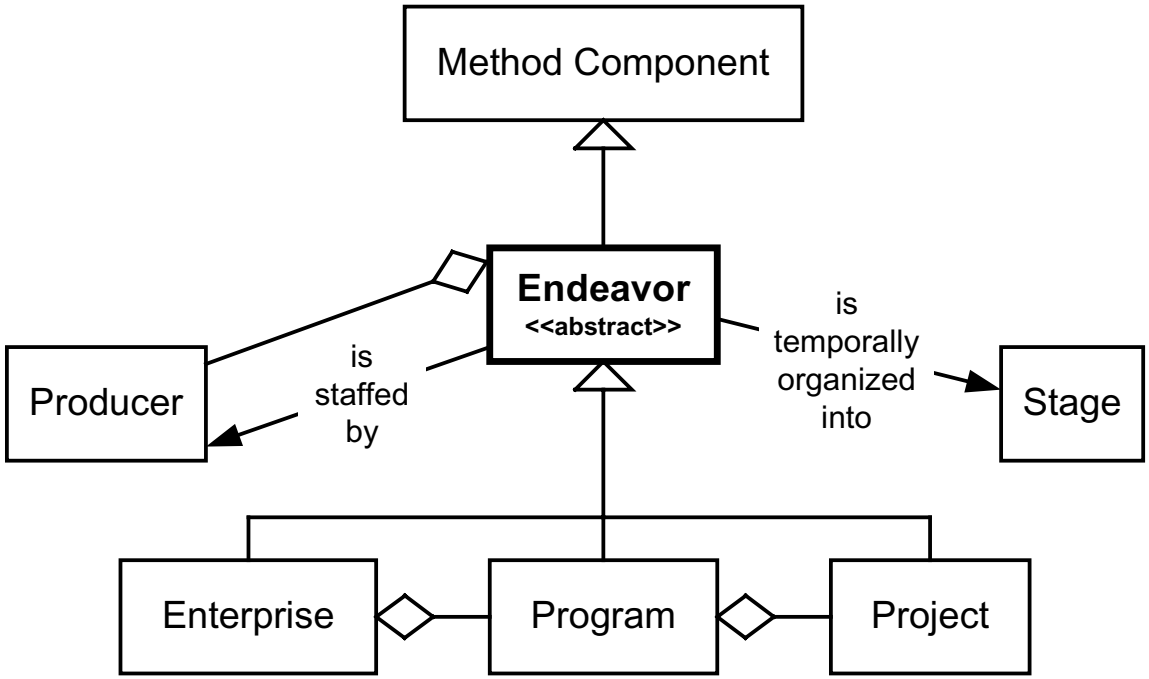
Done
start
4 Windows Explorer
2 Mozilla Thunderbird
MethodEngineering.ppt
OPEN Process Frame...
3:53 PM

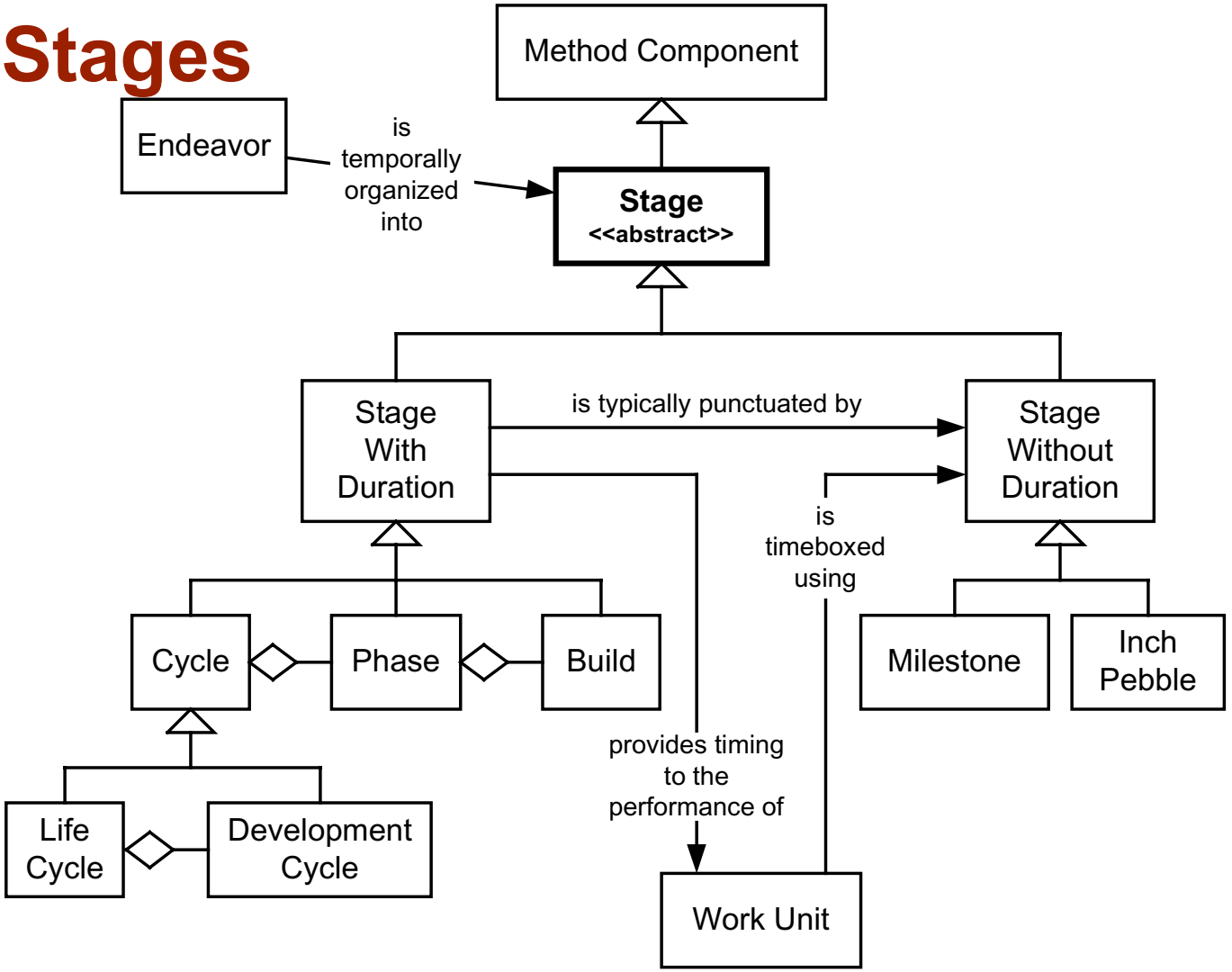
Description of the OPFRO 3



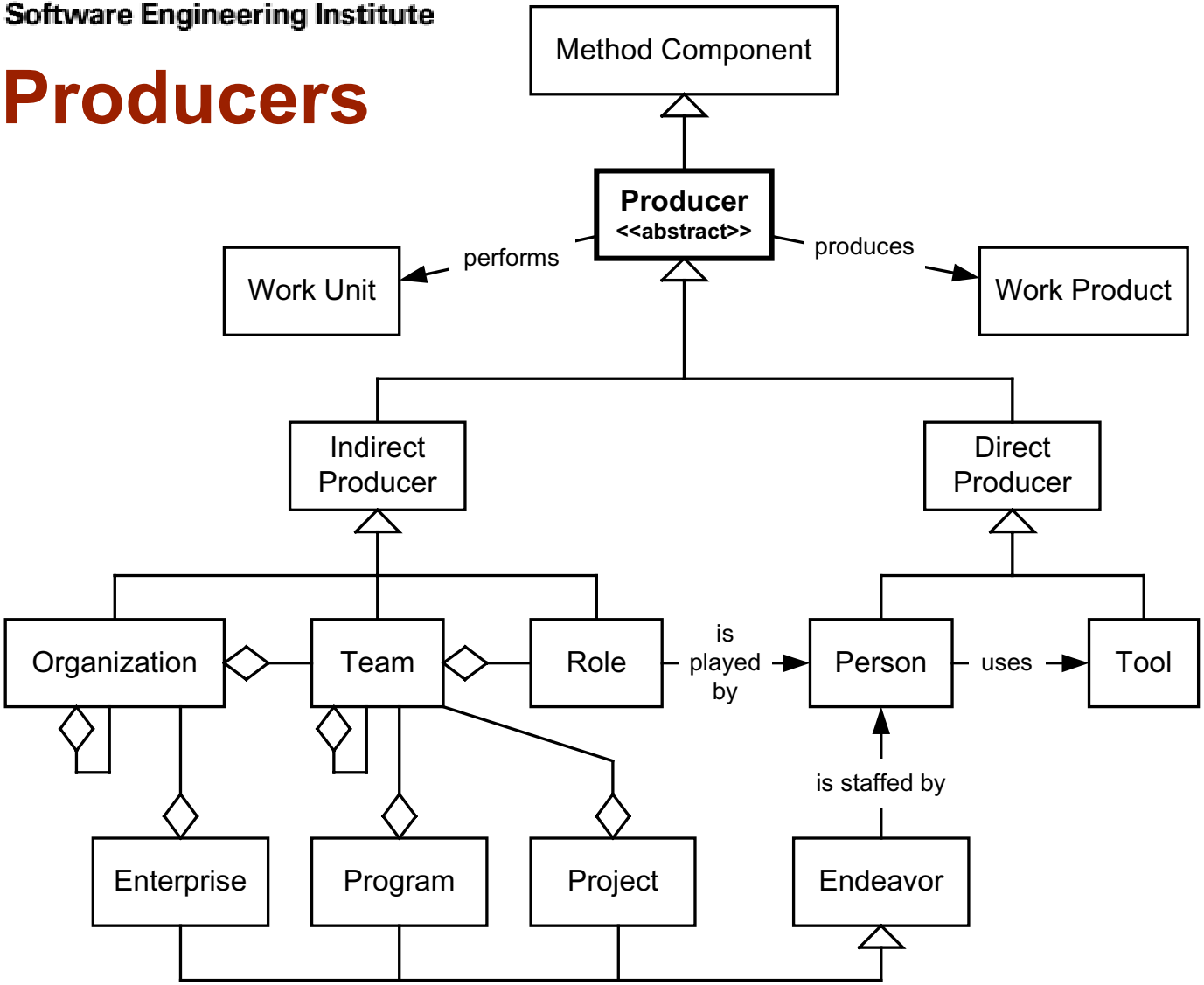
Endeavors



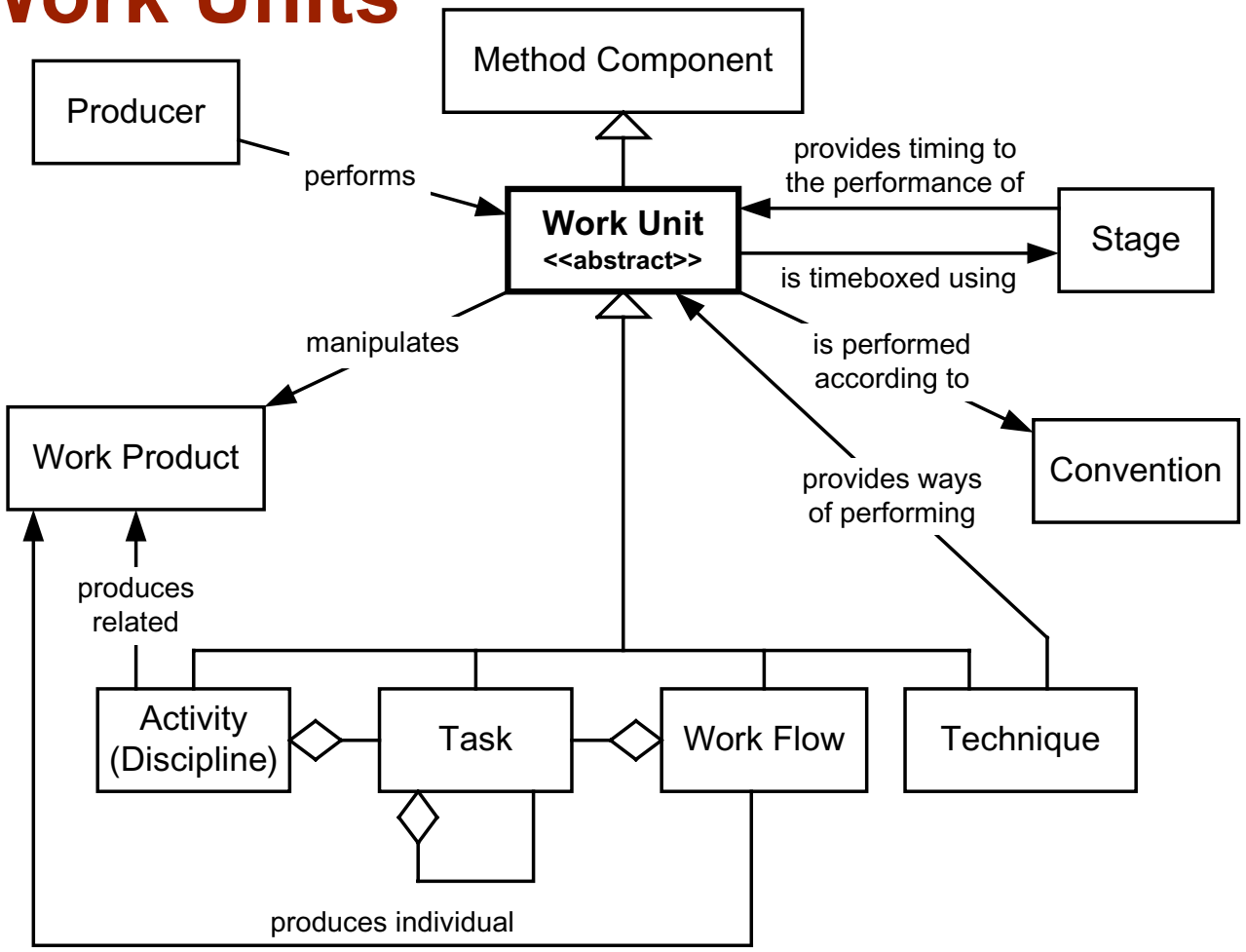
Stages



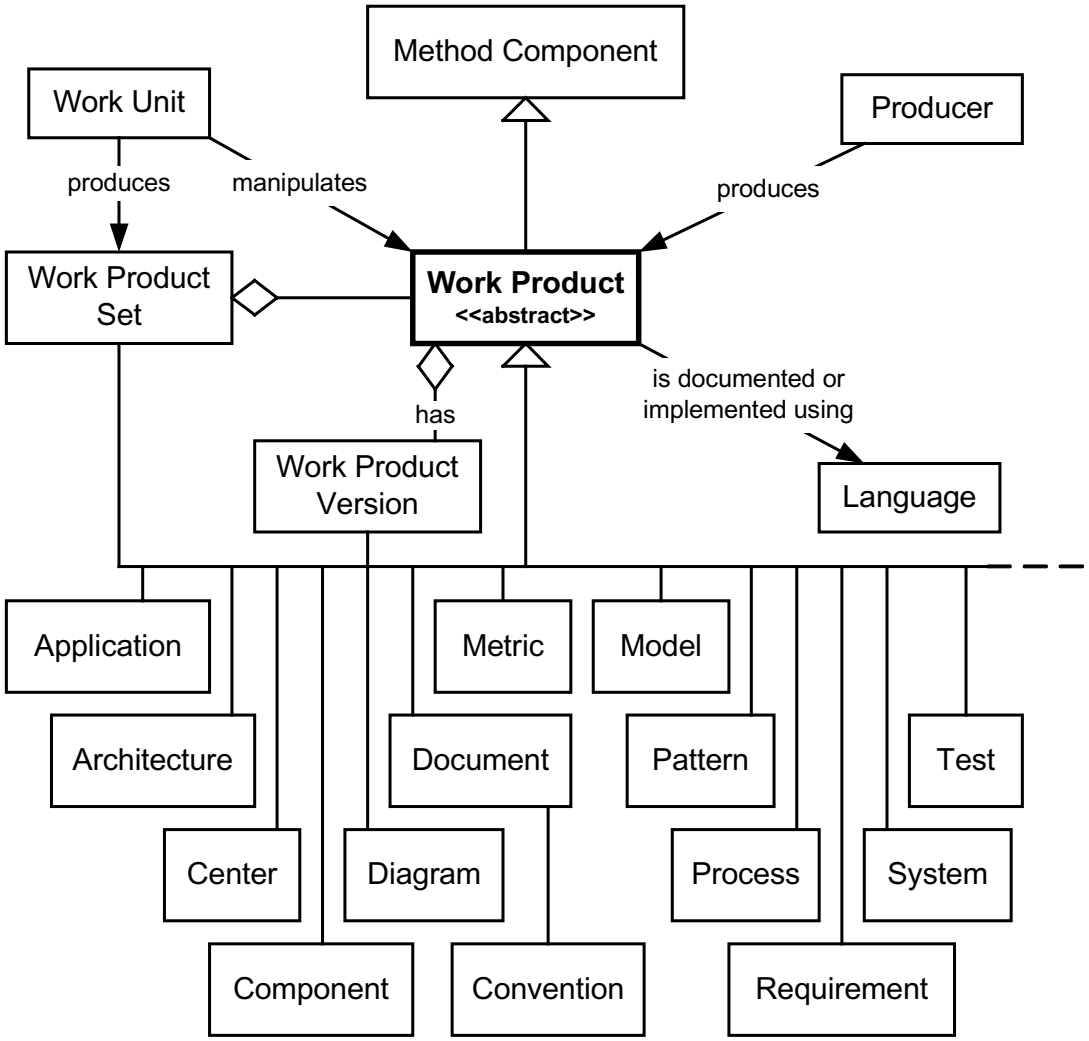
Producers



Work Units



Work Products



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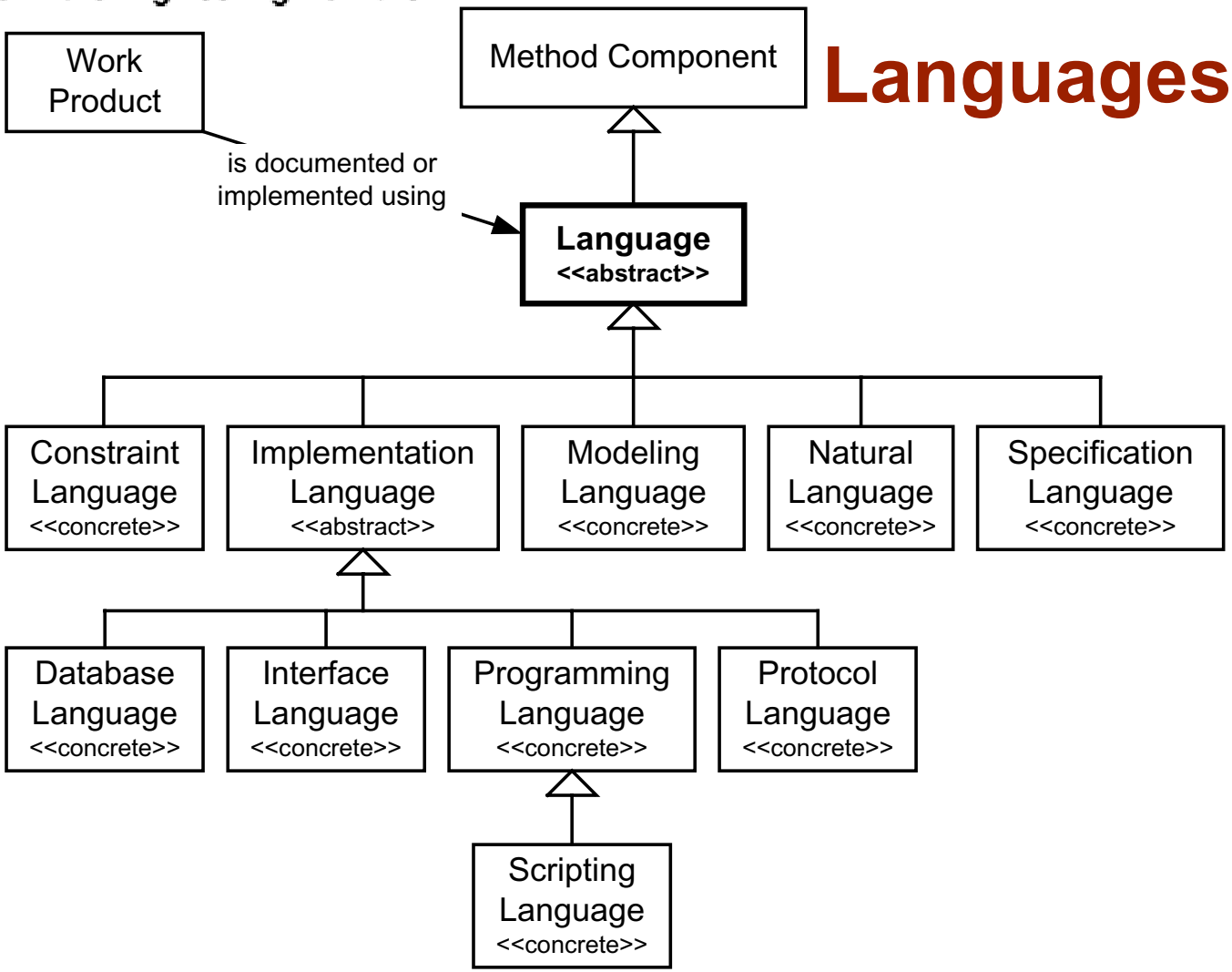
Languages



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Method Engineering with OPF

Major Tasks (highly iterative and incremental):

- Method Needs Assessment
- Method Construction
- Method Documentation
- Method Mandating
- Method Training
- Method Consulting

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Method Needs Assessment

Major Method Needs Influenced By:

- System vs. Hardware vs. Software
- Product Size, Criticality, and Lifespan
- Relevant Disciplines (a.k.a., Activities)
- Resulting Method Size and Formality
- Methodology Principles

Get Help From:

- Process Engineers
- Process Consultants
- Methodologists

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Method Construction Task

Method Component Selection and Tailoring:

- Activities (a.k.a., Disciplines)
- Work Products (and Languages)
- Tasks (and Steps)
- Producers (Teams, Roles, and Tools)
- Stages (Cycle, Phases, and Milestones)

Method Component Integration

- Integration
- Consistency Checking (and Fixing)
- Publication

Method Repository Extension

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Current Limitations

Manual process is too labor intensive and error prone.

Need XML and database versions

Need for automated help to:

- Find relevant and appropriate method components
- Determine appropriate method characteristics
- Tailor method components
- Integrate method components
- Ensure method consistency:
  - Dangling hyperlinks (pointers)
  - Orphaned method components (objects)
- Publish methods
- Maintain method components and methods
- Provide security (e.g., access control)
- Provide configuration management

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Future Directions

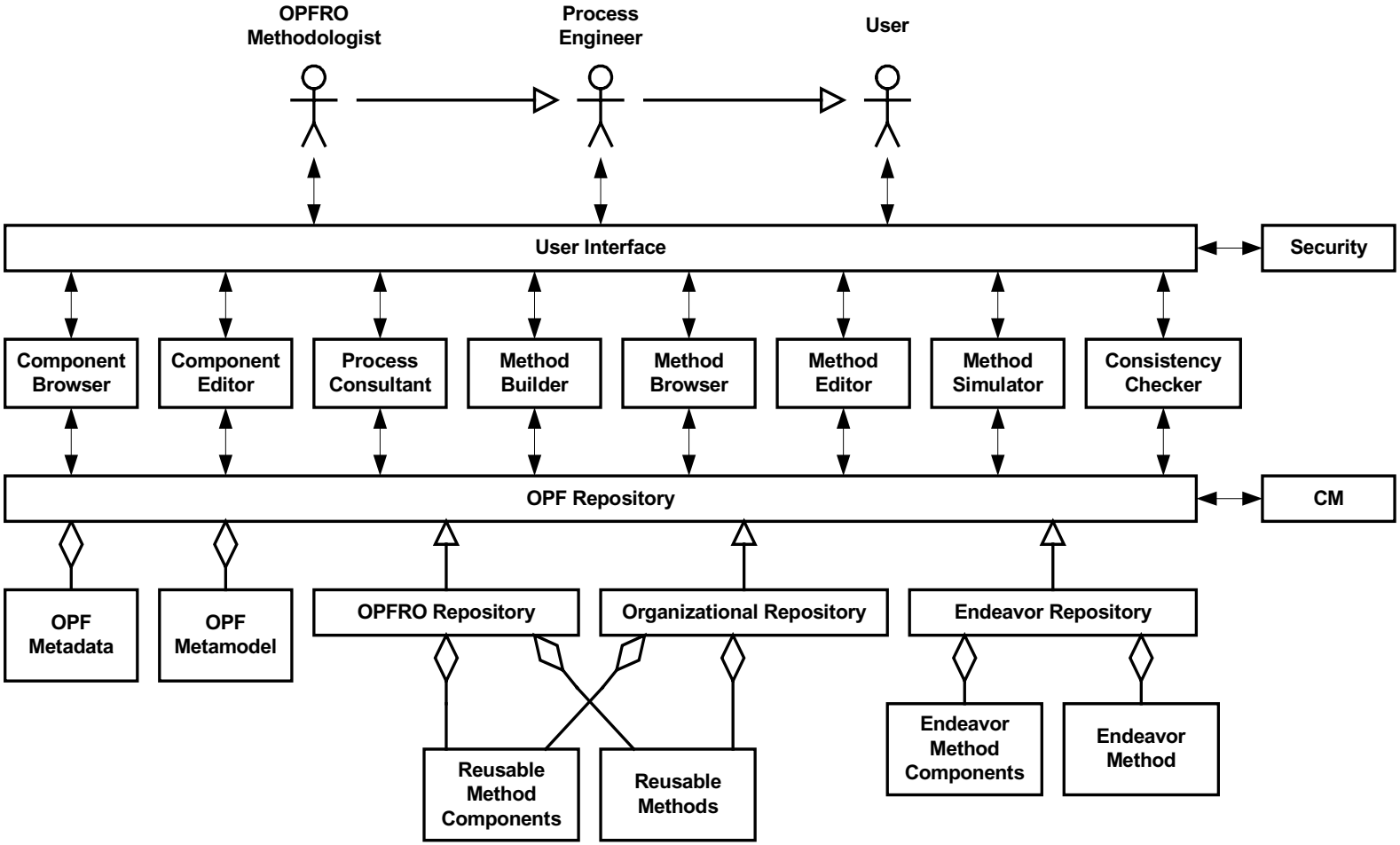
We seek vendors and others who will collaborate with us to:

- Incorporate the OPFR method components into their tool sets (e.g., Osellus and Eclipse epf)
- Help us build tools for the OPFR (e.g., volunteers and Cesar Gonzales)

We seek *active* volunteers for:

- Eclipse epf translation
- Tool Development
- Method Component Development & Maintenance

Future Directions – Planned Tools



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Conclusion

Method engineering enables a method engineer to create an endeavor-specific method by selecting, tailoring, and integrating reusable method components stored in a method repository.

Method engineering enables method engineers to produce methods that are more endeavor-specific than tailoring generic tailorable methods.

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Conclusion

Lego Effect:

- Standardization is in the repository of free, open source, reusable method components.
- Flexibility is in their selection and integration.

Method engineering is more practical if based on a:

- “Complete” repository of reusable method components
- Set of tools for selecting, tailoring, and integrating relevant method components

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Contact Information

OPEN

http://www.open.org.au

OPEN Process Framework Repository Organization (OPFRO)

http://www.opfro.org

http://www.donald-firesmith.com (old mirror Web site)

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